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(74) Agent: MURGITROYD & COMPANY; 373 Scotland Street, Glasgow G5 8QA (GB).			
(54) Title: PHEROMONE COMPOSITION			
(57) Abstract <p>The invention provides compositions formulated to attract fish, comprising at least one human female pheromone such as trimethylamine, pyrroline and salts thereof, steroids of the androstene family such as 5-alpha-androst-16 on 3 alpha ol, heterocyclic compounds such as indole and skatole and alkanolic acid compounds such as 4-methyloctanoic acid. Compositions can be formulated as liquids for direct application to bait, hooks or flies. Plastic bait can be manufactured including the composition. The composition can be used to attract fish by fishermen and anglers or to guide fish into paths to enable them to cross dams.</p>			

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1

1 PHEROMONE COMPOSITION

2

3 The invention relates to compositions formulated to
4 attract fish, in order to capture them. More
5 particularly the composition may be used in a liquid
6 form to be applied onto or into bait, lures or flies
7 which are used by anglers and commercial fishermen
8 alike.

9

10 Angling and fishing are sports which attract a large
11 number of people. A wide range of bait, lures and
12 flies are marketed at these persons in order to provide
13 them with more success in catching fish.

14

15 Some organic compounds are known to be active in the
16 feeding response of some species by enhancing feeding
17 or attracting fish to a general area. They are known
18 to occur at low concentration levels in crustacea and
19 also in a range of decomposing animals. Such compounds
20 are small organic odorants.

21

22 It has been reported that women have a greater success
23 rate in catching salmon than male anglers (see *Salmon*
24 *and women*, W. Paterson & P. Behan, published by H, F &
25 G Witherby Ltd 1990).

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2

1 It is an object of the invention to provide a
2 composition showing enhanced attracting effects on
3 fish.

4
5 It is another object of the invention to provide a
6 method to attract fish by using the composition of the
7 invention.

8
9 It is a further object of the invention to provide the
10 composition of the invention to be applied to bait
11 (live or dead), lures or flies (dry or wet) used in the
12 practise of angling or commercial fishing.

13
14 It has surprisingly been found that compositions
15 containing at least one human female pheromone presents
16 an unexpectedly good attractive effect on fish, and
17 particularly on salmon. Such compositions may be
18 applied on any kind of bait used by anglers and
19 fishermen.

20
21 Herein the term "pheromone" is taken to include amines
22 such as trimethylamine and pyrroline, and salts
23 thereof, steroids of the androstene family such as 5-
24 alpha-androst-16-en-3- α -ol, heterocyclic compounds
25 including nitrogen and/or sulphur such as indole and
26 skatole and alkanolic acid compounds such as 4-
27 methyloctanoic acid.

28
29 The objects of the invention are achieved with a fish
30 attracting composition comprising at least one human
31 female pheromone, or a synthetic nature-similar version
32 of the latter.

33
34 In one embodiment the invention provides at least one
35 female human pheromone together with an acceptable
36 carrier.

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1 Alternatively the composition can comprise a synthetic
2 female pheromone with a carrier. Preferably the
3 carrier solubilises the compound.

4
5 Preferred carriers include aliphatic alcohols such as
6 ethanol, monoethylene glycol and propylene glycol.

7
8 It is preferred that the pheromone used in the
9 composition of the invention be at least trimethylamine
10 or one volatile steroid of the androstene family
11 together with at least one compound chosen from a
12 complex array of alkanolic acids, including those having
13 a carbon atom number ranging from C4 to C5 and
14 especially substituted acids having a carbon atom
15 number ranging from C8 to C10.

16
17 A particularly preferred composition comprises at least
18 one salt of trimethylamine (typically the
19 hydrochloride) and 5-alpha-androst-16-en-3-alpha-ol.

20
21 A preferred composition according to the invention may
22 comprise in association with nature-similar versions of
23 human female pheromones, a suite of other potent aroma
24 chemicals (referred to herein as Key Impact Odorants
25 [KIOs]) which occur in both fresh and decomposing
26 animal tissue.

27
28 These other KIOs can be special amines and associated
29 heterocyclic compounds including nitrogen and sulphur
30 such as indole and skatole. It is also preferred that
31 the odorant compounds be provided with concentrations
32 of several order of magnitude higher than the ones
33 which are found in conventional bait.

34
35 The composition of the invention can be used in various
36 embodiments.

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1 In one embodiment the composition is a liquid which
2 bait, lure, fly, ground bait and/or hooks can be dipped
3 into or the liquid can be poured onto the bait, lure,
4 fly, ground bait and/or hooks.

5
6 The composition of the invention may also be formulated
7 as a spray to allow easy manipulation by the users and
8 could either be hand pumped or gas driven.

9
10 In a preferred embodiment the composition is formulated
11 to be injected into bait.

12
13 Alternatively the composition can be incorporated into
14 plastic bait.

15
16 To attract fish one may apply the composition of the
17 invention on a bait or a suitable support and provide
18 it in area where fish are used to be found.

19
20 The composition may also be applied directly onto bare
21 hooks.

22
23 The composition of the invention can be formulated for
24 a wide range of applications including combining with
25 floatant, spraying flies, combining with greasing or
26 degreasing agents to enable bait to float or sink as
27 required.

28
29 The formulation can also be combined with ground bait
30 and dried for storage purposes.

31
32 Formulations of the present invention are surprisingly
33 effective in aqueous solution. Whereas a preferred
34 carrier is ethanol and a basic formulation can include
35 a salt of trimethylamine in ethanol, in use the
36 formulation produces trimethylamine on contact with

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1 water. In fishing, the formulation will be vastly
2 diluted in water and therefore it is most surprising
3 that use of the formulation can effectively enhance
4 fishing.

5
6 The pheromones which may be advantageously used in a
7 composition according to the invention include the
8 following:

9
10 Trimethylamine (TMA) (as derived from a salt of
11 trimethylamine such as the hydrochloride) is an
12 exceptionally interesting KIO pheromone. It occurs on
13 human skin and is especially important for females. It
14 is the characteristic odour of a menstruating female.
15 The odour profile is distinctive and is not shared by
16 closely related amines such as, for example,
17 dimethylamine. The aroma is that of fresh shell fish
18 at the threshold level. In fact it is thought that
19 most of the charm of oyster, scallops and the like
20 comes from TMA. The aroma changes with increasing
21 concentration and becomes increasingly unpleasant. At
22 a high level TMA will be perceived as an off-odour in
23 shell fish and the like, and as a sign of lack of
24 hygiene in a human subject.

25
26 The threshold concentration for humans is about 1ppb (1
27 part in 10^9) - this is low by olfactory standards.
28 There is, in fact, great individual variability and the
29 concentration varies around the mean figure by about 3
30 orders of magnitude. This gives rise to great
31 variability; for example, a crustacean may appear
32 delightful to a person of high threshold but may be
33 abhorrent to a person of low threshold (skin
34 sensitivity). See in that matter "Ageing and the Sense
35 of Smell" C. Van Toller, GH Dodd & A Billing, Charles T
36 Thomas, Publisher, Springfield, Illinois, USA, 1985.

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1 Another interesting pheromone to be used in the fish-
2 attracting composition is 1-Pyrroline. This is a rare
3 and little studied human pheromone. It is unstable and
4 therefore very difficult to study. It is formed by
5 oxidation of precursor molecules such as 1,4-
6 diaminobutane and 1,4-diaminopentane. These amines
7 occur in a variety of human tissues, and can be formed
8 from appropriate amino acids.

9
10 In order to overcome the instability problem when 1-
11 Pyrroline is to be used in a fish-attracting
12 composition of the invention, the parent amines (i.e.
13 the above mentioned precursors) are incorporated at a
14 high level in the composition. They will slowly
15 oxidize and release the unstable active odorant.

16
17 These parent amines are also called respectively,
18 putrescine and cadaverine, for obvious olfactory
19 reasons and occurred in decomposing animal tissue. The
20 human threshold is in the ppb range.

21
22 A further preferred pheromone is the 5-alpha-androst-
23 16-en-3- α -ol. This pheromone is a well-known pheromone
24 which is found in both males and females but is thought
25 to be more important for women (in contrast to the
26 related steroid pheromone, alpha-androstenone). The
27 threshold for human is in the low ppb range. The odour
28 is usually described as musky.

29
30 A still further preferred pheromone is 4-Methyloctanoic
31 acid which is characteristic of the scalp odour and may
32 be found in gamey meat. The threshold is unusually low
33 for a fatty acid and is in the region of ppb. It is
34 has been reported that women are much more sensitive to
35 this odorant than men.

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1 A particular composition according to the invention has
2 been tested in fishing experiments on the River Ness,
3 other rivers in the Highlands, and in Ireland and on a
4 variety of Lochs. Positive results have been obtained.

5
6 The composition of this particular non-limiting
7 composition is the following :

8	9	Component No	Name	Amount Required for 1000 litres of solvent (ethanol)
10				
11				
12				
13	1		Trimethylamine	7kg
14			hydrochloride	
15	2		1,4 diaminobutane	0.7kg
16	3		1,4 diaminopentane	0.1kg
17	4		indole	50 grm
18	5		skatole	40 grm
19	6		isovaleric acid	40 grm
20	7		4-methyloctanoic acid	10 grm
21	8		4-methylnonanoic acid	5 grm
22	9		phenylacetic acid	20 grm
23	10		2-methyl-E-butenic acid	5 grm
24	11		4-methylpentanoic acid	10 grm
25	12		2-methyl-2-pentenoic acid	10 grm
26	13		5-alpha-androst-16-en-3-alpha-ol	60 mg-6g

27
28 A more general preferred composition comprises

29	30	Component No	Name	Amount Required for 1000 litres of solvent
31				
32				
33				
34	1		KIO Pheromone	0.05-50kg
35	2		Alkanoic acid	5g-1.5kg
36	3		Amines	0.1kg-8kg

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1 Even if a special emphasis has been given on the
2 utility of the composition in order to ease fishing it
3 is understood that the composition to attract fish as
4 above described may be used for other purposes. For
5 example it may be used to attract salmon into special
6 paths provided in order to help them to cross dams,
7 waterfalls or other obstructions.

8

9 Experimental Study

10

11 An initial study was carried out to establish a
12 relationship between the use of female pheromones at a
13 chosen concentration and the increase in the catch of
14 salmon, either by fish size or numbers caught using the
15 conventional rod and line method with a selected range
16 of hand tied salmon flies.

17

18 Three specialist salmon fly fishermen were chosen who
19 regularly fished prime salmon rivers, have extensive
20 combined specialist knowledge gained from 20 years of
21 fly fishing, fish a regular pattern over the entire
22 season, have experience of observing changes and
23 variations in fish runs and catch methods and were
24 willing to comply with strict rules with regard to
25 reporting procedures.

26

27 Rivers chosen for the study covered the entire salmon
28 cycle, i.e Spring-Summer and Autumn salmon runs,
29 January-September 1997.

30

31 Results

32

33 Some interesting findings came to light at the season
34 end:

35

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1 Of the three subjects chosen, all had a significant
2 change in their catch pattern, (1) 43 salmon caught (2)
3 75 salmon caught (3) 15 salmon caught.

4
5 Subjects (1) and (2) fly fished the middle/upper
6 reaches of a major salmon river. The river is world
7 famous for the range of salmon fishing available.
8 Spring salmon run (10-25lbs) is moderate. Large runs
9 of Summer grilse (3-8 lbs) and a good run of Autumn
10 salmon (10-30 lbs).

11
12 Subject (3) fly fished a major East Coast spring salmon
13 fishery (10-30 lbs) This river has small runs of summer
14 salmon owing to licensed commercial fishing in estuary
15 waters.

16
17 In all cases the reports returned were similar with
18 more consistent catches particularly when fish were in
19 holding pools (when water levels receded after floods).

20
21 Catch summary (Salmon caught)

22			
23	Subject	1996	1997
24	(1)	37	75
25	(2)	18	43
26	(3)	9	15

27
28 No exceptional fish size was reported over that of the
29 1996 season.

30
31 Water levels for 1997 were consistently high by
32 comparison to 1996 resulting in concentration of
33 several salmon runs in holding pools throughout the
34 entire river system.

35
36 Current information on official commercial salmon catch

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1 ventures for 1997 would indicate a 20% reduction on the
2 1996 season.

3
4 Water temperatures were slightly higher than previous
5 years.

6
7 Most salmon for this study were caught on an imitation
8 shrimp fly dressing of various sizes.

9
10 All subjects chosen for this study were male with
11 average age of 45 years.

12
13 All subjects chosen tie their own flies, however,
14 similar selected shrimp/prawn flies were distributed to
15 all.

16
17 Salmon flies used were purchased from local fishing
18 tackle shops.

19
20 The final results of this initial trial study would
21 indicate some relationship between the choice of fly
22 with sample female pheromone and the traditional fly
23 fishing method.

24
25 One fisherman has fished for Sea Bass (commonly known
26 as Salmon Bass) off the east coast for many years, with
27 varying success. This specialist fishing activity
28 fished off chosen rocky points in July/August would
29 normally yield 1-2 fish per outing. This year, using
30 identical fishing lures, substantially improved bass
31 catches were recorded with better than average sizes
32 using the female pheromone formulation described
33 herein. Other specialist bass anglers fishing the same
34 waters did not use the formulation and did not return
35 above average catches.

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1 CLAIMS

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1. A fish attracting composition comprising at least one human female pheromone, or a synthetic nature-similar version thereof.

2. A composition as claimed in claim 1 comprising a human female pheromone or a synthetic nature-similar version thereof together with an acceptable carrier.

3. A composition as claimed in any of the previous claims wherein the carrier is an aliphatic alcohol or propylene glycol.

4. A composition as claimed in any of the previous claims wherein the pheromone is at least one volatile steroid of the androstene family together with at least one compound chosen from a complex array of alkanolic acids.

5. A composition as claimed in any of the previous claims wherein the composition comprises trimethylamine hydrochloride and 5- alpha-androst-16-en-3-alpha-ol.

6. A composition as claimed in any of the preceding claims wherein the composition is a liquid.

7. A composition as claimed in any of the preceding claims which is formulated for injection into bait.

8. A composition as claimed in any of claims 1-6 which is formulated as a spray.

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12

- 1 9. Plastic bait including the composition as claimed
- 2 in any of claims 1-6.
- 3
- 4 10. Dried ground bait including a composition as
- 5 claimed in any of claims 1-5.
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- 11 /u/nur/spec:20/p2000-



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A01N 45/00, A01K 97/04 // (A01N 45/00, 43:38, 37:10, 37:06, 37:02, 33:04)		A1	(11) International Publication Number: WO 99/16315
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(54) Title: PHEROMONE COMPOSITION			
(57) Abstract			
<p>The invention provides compositions formulated to attract fish, comprising at least one human female pheromone such as trimethylamine, pyrroline and salts thereof, steroids of the androstene family such as 5-alpha-androst-16-en-3-alpha-ol, heterocyclic compounds such as indole and skatole and alkanolic acid compounds such as 4-methyloctanoic acid. Compositions can be formulated as liquids for direct application to bait, hooks or flies. Plastic bait can be manufactured including the composition. The composition can be used to attract fish by fishermen and anglers or to guide fish into paths to enable them to cross dams.</p>			

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EE	Estonia						

1 CLAIMS

2
3 1. A fish attracting composition comprising at least
4 one human female pheromone, or a synthetic nature-
5 similar version thereof.

6
7 2. A composition as claimed in claim 1 comprising a
8 human female pheromone or a synthetic nature-
9 similar version thereof together with an
10 acceptable carrier.

11
12 3. A composition as claimed in any of the previous
13 claims wherein the carrier is an aliphatic alcohol
14 or propylene glycol.

15
16 4. A composition as claimed in any of the previous
17 claims wherein the pheromone is at least one
18 volatile steroid of the androstene family together
19 with at least one compound chosen from a complex
20 array of alkanoic acids.

21
22 5. A composition as claimed in any of the previous
23 claims wherein the composition comprises
24 trimethylamine hydrochloride and 5- alpha-androst-
25 16-en-3- α -ol.

26
27 6. A composition as claimed in any of the preceding
28 claims wherein the composition is a liquid.

29
30 7. A composition as claimed in any of the preceding
31 claims which is formulated for injection into
32 bait.

33
34 8. A composition as claimed in any of claims 1-6
35 which is formulated as a spray.
36

1 9. Plastic bait including the composition as claimed
2 in any of claims 1-6.

3
4 10. Dried ground bait including a composition as
5 claimed in any of claims 1-5.

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11 /u/mur/specs20/p20686-

1
ART 34 AMDT

1 CLAIMS

2

3 1. A fish attracting composition comprising at least
4 one human female pheromone, or a synthetic nature-
5 similar version thereof wherein the pheromone is
6 at least one volatile steroid of the androstene
7 family and the composition further comprises at
8 least one compound chosen from a complex array of
9 alkanolic acids.

10

11 2. A composition as claimed in claim 1 further
12 comprising an acceptable carrier.

13

14 3. A composition as claimed in any of claims 1 or 2
15 wherein the carrier is an aliphatic alcohol or
16 propylene glycol.

17

18 4. A composition as claimed in any of the previous
19 claims wherein the composition comprises
20 trimethylamine hydrochloride and 5- alpha-androst-
21 16-en-3- α -ol.

22

23 5. A composition as claimed in any of the preceding
24 claims wherein the composition is a liquid.

25

26 6. A composition as claimed in any of the preceding
27 claims which is formulated for injection into
28 bait.

29

30 7. A composition as claimed in any of claims 1-5
31 which is formulated as a spray.

32

33 8. Plastic bait including the composition as claimed
34 in any of claims 1-5.

AMENDED SHEET

ART 34 AMDT

2

- 1 9. Dried ground bait including a composition as
- 2 claimed in any of claims 1-4.
- 3
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AMENDED SHEET

PATENT COOPERATION TREATY

PCT

REC'D 15 NOV 1999

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P20686/CPA/RMC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/GB98/02941	International filing date (day/month/year) 30/09/1998	Priority date (day/month/year) 01/10/1997
International Patent Classification (IPC) or national classification and IPC A01N45/00		
Applicant KIOTECH LIMITED et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.



2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☒ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand 29/04/1999	Date of completion of this report 15 NOV 1999
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Donovan-Beermann, T Telephone No. +49 89 2399 8213 

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/GB98/02941

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-10 as originally filed

Claims, No.:

1-9 as received on 29/10/1999 with letter of 26/10/1999

2. The amendments have resulted in the cancellation of:

- ☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-9
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-9
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-9
	No:	Claims	

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2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

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EXAMINATION REPORT - SEPARATE SHEET**

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Ad Section V:

The present application relates to compositions for attracting fish, comprising at least one human female pheromone, or a synthetic nature-similar version thereof, wherein the pheromone is at least one volatile steroid of the androstene family, and the compositions further comprise at least one compound chosen from a complex array of alkanolic acids.

The amendments to the claims and description are considered allowable according to Art.34(2)(b) PCT in that they do not extend the scope of the application beyond that of the disclosure as originally filed.

FR-A-2561871 (D1) discloses methods of attracting fish by simulating the compounds given off by fish or other marine animals, which indicate their presence to other fish. Compounds found to have significant effects are eg. trimethylamine, indole, scatole, putrescine and cadaverine among others (see page 4, lines 9-28).

EP-A-219416 (D3) discloses methods and compositions for attracting fish, which contain at least an amine, a second compound chosen from among amino acids, urea and amides, and optionally other components (see page 2, lines 40-60). Examples are provided showing the use of trimethylamine in such fish attractants.

FR-A-582224 (D4) discloses attractant/bait compositions for fish, containing ammonia or its amine derivatives or trimethylamine. The compounds may be formulated as powders, sprays, baits etc., using various carriers.

EP-A-280443 (D5) discloses repellent compositions for deer containing compounds extracted from lion faeces. These compounds include alkanolic acids, indoles, amines (see page 2, line 31-page 3, line 37).

WO-A-8505014 (D6) discloses baits pellets for fish, containing fish attractants such as trimethylamine, with carriers.

Documents D1 and D3 to D6 are no longer relevant to novelty of the subject matter of

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the claims, since none of these documents disclose the claimed compositions containing androstene steroids.

WO-A-8300417 (D2) discloses the use of human pheromones as animal repellents (see page 3, paragraph 2-page 6, paragraph 1). The compounds may be formulated with carriers, including as liquids (see page 8, paragraph 2). Formulations may be incorporated into solid bodies eg. in polymers (see page 9, paragraph 2-page 10-line 1).

The compounds listed on page 4 of D2 include various androstene compounds including the preferred compound of the present application. However, there is no disclosure of the incorporation into these compositions of alkanoic acids such as presently claimed. Thus the subject matter of claims 1-9 is novel with respect to D2 (Art.33(2) PCT).

It can neither be derived from D2, which discloses the use of androstene compounds as animal repellents, nor from D1, D3, D4 and D6, disclosing the use of other chemical types of pheromones as fish attractants, that compositions containing androstene compounds and compounds chosen from a complex array of alkanoic acids would be effective as fish attractants. Thus inventive step of the claimed subject matter can also be acknowledged (Art.33(3) PCT).

Ad Section VII:

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents cited above is not mentioned in the description, nor are these documents identified therein.

The description should be adapted to correspond to the subject matter of the claims on file.

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

United States Patent and Trademark
Office
(Box PCT)
Crystal Plaza 2
Washington, DC 20231
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing (day/month/year) 03 June 1999 (03.06.99)	
International application No. PCT/GB98/02941	Applicant's or agent's file reference
International filing date (day/month/year) 30 September 1998 (30.09.98)	Priority date (day/month/year) 01 October 1997 (01.10.97)
Applicant DODD, George, Henry	

1. The designated Office is hereby notified of its election made:

☒ in the demand filed with the International Preliminary Examining Authority on:

29 April 1999 (29.04.99)

☐ in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐ was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

<p>The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland</p> <p>Facsimile No.: (41-22) 740.14.35</p>	<p>Authorized officer</p> <p>Lazar Joseph Panakal</p> <p>Telephone No.: (41-22) 338.83.38</p>
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PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/GB 98/ 02941	International filing date (day/month/year) 30/09/1998	(Earliest) Priority Date (day/month/year) 01/10/1997
Applicant KIOTECH LIMITED et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. ☐ Certain claims were found unsearchable (see Box I).

2. ☐ Unity of invention is lacking (see Box II).

3. ☐ The international application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the international search was carried out on the basis of the sequence listing

☐ filed with the international application.

☐ furnished by the applicant separately from the international application,

☐ but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.

☐ Transcribed by this Authority

4. With regard to the **title**, ☒ the text is approved as submitted by the applicant

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is:

Figure No. — ☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☐ None of the figures.

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ational Application No
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A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A01N45/00 A01K97/04 //(A01N45/00,43:38,37:10,37:06,37:02,
33:04)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A01N A23K A01K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 561 871 A (GROUPE ETU REALISA NAVALES) 4 October 1985 see page 1, line 12 - page 4, line 28 see page 4, line 38 - page 5, line 6 see page 6, line 20 - line 30 see page 7, line 2 - line 11 see page 7, line 24 - line 38 see page 9, line 17 - page 10, line 6 ---	1,2
A	WO 83 00417 A (NORDTEND AS) 17 February 1983 see page 3, paragraph 2 - page 6, paragraph 1	4,5
X	see page 8, last line - page 10, paragraph 3; claims 7,9; examples 5E,,6M --- -/--	1-3,6-10

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"S" document member of the same patent family

Date of the actual completion of the international search

2 February 1999

Date of mailing of the international search report

11/02/1999

Name and mailing address of the ISA

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Muellners, W

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 98/02941

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 219 416 A (NAVALES RECH GRP) 22 April 1987 see page 2, line 3 - line 60 see page 4, line 18 - line 59 see claims 22,23,32-34; examples 5,6,10,16,19 ---	1,2,6,7, 9,10
X	FR 582 224 A (M. M.-J. OLIVIERO & G.-J. CHAMAGNE) 15 December 1924 see the whole document ---	1,2,6-8, 10
X	EP 0 280 443 A (DALGETY LTD) 31 August 1988 see page 2, line 31 - page 3, line 5 see page 3, line 15 - line 37 see page 4, line 27 - line 36; examples I-III ---	1-3,6-10
X	WO 85 05014 A (COX JAMES P) 21 November 1985 see page 3, line 4 - line 10 see page 4, line 22 - line 25; example 3 -----	1,2

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 98/02941

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2561871	A	04-10-1985	NONE	
WO 8300417	A	17-02-1983	AT 22775 T	15-11-1986
			CA 1206874 A	01-07-1986
			DK 38083 A	17-02-1983
			EP 0084537 A	03-08-1983
			FI 830330 A,B,	01-02-1983
			US 4451460 A	29-05-1984
			US 4534976 A	13-08-1985
			US 4657759 A	14-04-1987
			US 4668455 A	26-05-1987
EP 0219416	A	22-04-1987	FR 2588156 A	10-04-1987
			DE 3681548 A	24-10-1991
			JP 62091135 A	25-04-1987
			OA 8422 A	30-06-1988
			US 4752480 A	21-06-1988
FR 582224	A		NONE	
EP 0280443	A	31-08-1988	CA 1329539 A	17-05-1994
			DD 273193 A	08-11-1989
			DE 3889139 D	26-05-1994
			DE 3889139 T	24-11-1994
			FI 880751 A	19-08-1988
			JP 63239206 A	05-10-1988
			US 4818535 A	04-04-1989
			ZA 8801069 A	11-08-1988
WO 8505014	A	21-11-1985	AU 4292985 A	28-11-1985
			BR 8506725 A	23-09-1986
			DK 1386 A	03-03-1986
			EP 0179144 A	30-04-1986
			FI 855200 A	31-12-1985
			JP 61502024 T	18-09-1986